DEPARTMENT OF THE INTERIOR
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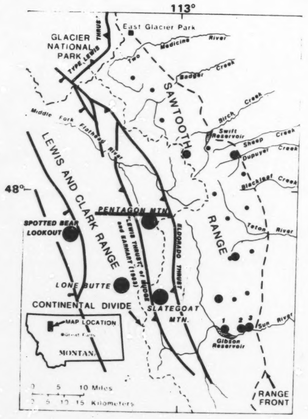
OPEN-FILE REPORT 86-39

INTRODUCTION

PENTAGON MOUNTAIN EXPOSES ONE OF THE BEST OF THE FEW SECTIONS OF MISSISSIPPIAN ROCKS COMPRISING THE MADISON GROUP IN THE LEWIS AND CLARK RANGE OF NORTHWESTERN MONTANA. THE MISSISSIPPIAN SEQUENCE AT PENTAGON MOUNTAIN CAN BE READILY CORRELATED LITHOLOGICALLY ACROSS THE ELDORADO-"LEWIS THRUST SYSTEM", WITH MISSISSIPPIAN ROCKS THAT CROP OUT TO THE EAST IN THE SAWTOOTH RANGE.

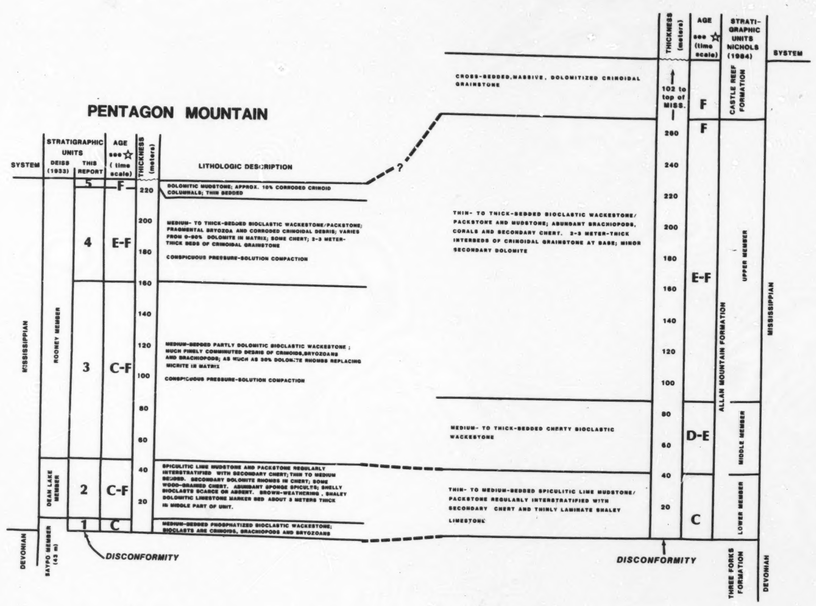


INDEX MAP OF PART OF THE LEWIS AND CLARK AND SAWTOOTH RANGES

THE RANGE FRONT (HEAVY DASHED LINE) COINCIDES WITH THE EASTERNMOST SURFACE OUTCROPS OF THE MADISON GROUP. UNLABELED DOTS MARK THE LOCATION OF CONTROLLED STRATIGRAPHIC SECTIONS IN THE SAWTOOTH RANGE. LABELED DOTS ARE THE SITES OF STRATIGRAPHIC SECTIONS AT THE FOLLOWING LOCALITIES:

1. GIBSON RESERVOIR
2. HANNAH GULCH, SUN RIVER
3. DIVERSION DAM, SUN RIVER

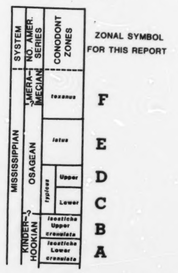
SAWTOOTH RANGE (COMPOSITE OF SECTIONS 1, 2 AND 3, AS SHOWN ON INDEX MAP)



LITHOLOGIC CORRELATION OF PENTAGON MOUNTAIN AND SAWTOOTH RANGE SECTIONS

THE DIFFERENCE IN THICKNESS BETWEEN THE PENTAGON MOUNTAIN AND SAWTOOTH RANGE SECTIONS IS PARTLY ATTRIBUTABLE TO THE LACK OF PRESSURE SOLUTION IN THE SAWTOOTH RANGE.

☆TIME SCALE



ALL CAI VALUES = 1 (indicating host rock was never beyond 60°C.)

1. ALL IDENTIFICATIONS, AGE ASSIGNMENTS AND CAI VALUE INTERPRETATIONS ARE BY ANITA G. HARRIS AND K. M. NICHOLS.
2. ASSIGNMENT OF CONODONT ZONES TO STAGES FOLLOWING LANE, SANDBERG, AND ZIGLER (1980).

REGIONAL SIGNIFICANCE

NOT ONLY DOES THE MISSISSIPPIAN SECTION AT PENTAGON MOUNTAIN CORRELATE LITHOLOGICALLY WITH THAT OF THE SAWTOOTH RANGE (e.g., SECTIONS 1, 2 AND 3), BUT ITS LOWER PART IS ALSO LIKE THAT AT SLATEGOAT MOUNTAIN FARTHER SOUTH IN THE UPPER PLATE OF THE ELDORADO THRUST AND AT SPOTTED BEAR LOOKOUT IN THE UPPER PLATE OF THE STRUCTURALLY HIGHER "LEWIS THRUST" OF RUDGE AND EARHART (1980; 1983). THE MISSISSIPPIAN SECTION AT LONE BUTTE IS ALSO CLOSELY LIKE THAT AT PENTAGON MOUNTAIN, ACCORDING TO SLOSS AND LAIRD (1945).

SUMMARY

1. MISSISSIPPIAN STRATIGRAPHY CHANGES LITTLE FROM ONE THRUST PLATE TO ANOTHER ACROSS THE LEWIS AND CLARK RANGE AND SAWTOOTH RANGE.
2. THE GREATEST DIFFERENCE AMONG SECTIONS IS THE PRONOUNCED SOLUTION COMPACTION IN UNITS 3 AND 4 AT PENTAGON MOUNTAIN, AS COMPARED WITH SAWTOOTH RANGE SECTIONS. THIS PART OF THE SECTION IS NOT PRESENT AT SPOTTED BEAR LOOKOUT AND HAS NOT YET BEEN STUDIED FOR THIS FEATURE AT LONE BUTTE AND SLATEGOAT MOUNTAIN.

CONCLUSIONS

EITHER

(1) THE CHARACTER OF THE STRUCTURALLY TELESCOPED MISSISSIPPIAN SEQUENCE WAS ORIGINALLY ALIKE OVER A VERY LARGE AREA

OR

(2) THRUST DISPLACEMENTS WITHIN THE LEWIS AND CLARK RANGE AND SAWTOOTH RANGE ARE RELATIVELY MINOR (MUDGE AND EARHART, 1980)

OR

(3) IF THE PRONOUNCED SOLUTION COMPACTION AT PENTAGON MOUNTAIN IS A LARAMIDE FEATURE AND IS A CONSEQUENCE OF TECTONIC LOADING, AND IF THE "LEWIS" AND ELDORADO THRUSTS (OF MUDGE AND EARHART, 1980; 1983) CUT THE TYPE LEWIS THRUST (SEE INDEX MAP), ALL OF THE MISSISSIPPIAN STRATA OF THE LEWIS AND CLARK RANGE AND SAWTOOTH RANGE COULD BE IN THE LOWER PLATE OF THE REAL LEWIS THRUST.

REFERENCES CITED

DEISS, C. F., 1933, PALEOZOIC FORMATIONS OF NORTHWESTERN MONTANA: MONTANA BUREAU MINES AND GEOLOGY MEM. 6, 51 p.

LANE, H. R., SANDBERG, C. A., AND ZIEGLER, W., 1980, TAXONOMY AND PHYLOGENY OF SOME LOWER CARBONIFEROUS CONODONTS AND PRELIMINARY STANDARD POST-SIPHONODELLA ZONATION: GEOLOGICA ET PALAEONTOLOGICA, N.F., v., p. 117-164.

RUDGE, M. R., AND EARHART, R. L., 1980, THE LEWIS THRUST FAULT AND RELATED STRUCTURES IN THE SOUTHERN HALF, NORTHWESTERN MONTANA: U. S. GEOL. SURVEY PROF. PAPER 1170, 18 P.

RUDGE, M. R., AND EARHART, R. L., 1983, BEDROCK GEOLOGIC MAP OF PART OF THE ROBT-1980 DISTURBED BELT, LEWIS AND CLARK , TETON, PONDERA, GLACIER, FLATHEAD, CASCADE, AND POWELL COUNTIES, MONTANA:U. S. GEOLOGICAL SURVEY MISC. INVESTIG. SERIES, MAP I-1372.

NICHOLS, K. M., 1984, STRATIGRAPHY OF THE UPPER PART OF THE MADISON GROUP, SAWTOOTH RANGE,NORTHWESTERN MONTANA, IN McBANE, J. D. AND GARRISON, P. D., EDS., NORTHWEST MONTANA AND ADJACENT CANADA: MONTANA GEOLOGICAL SOCIETY , 1984 FIELD CONFERENCE AND SYMPOSIUM, P. 127-149.

SLOSS, L. L., AND LAIRD, W. M., 1945, MISSISSIPPIAN AND DEVONIAN STRATIGRAPHY , NORTHWESTERN MONTANA: U. S. GEOL. SURVEY PUBLIC. CHART 19, OIL AND GAS INV. SER.

REGIONAL SIGNIFICANCE OF LITHOLOGIC CORRELATION OF MISSISSIPPIAN ROCKS AT PENTAGON MOUNTAIN AND THE SAWTOOTH RANGE, NORTHWESTERN MONTANA

by K. M. NICHOLS, 1986

THIS REPORT IS PRELIMINARY AND HAS NOT BEEN REVIEWED FOR CONFORMITY WITH U. S. GEOLOGICAL SURVEY EDITORIAL STANDARDS AND STRATIGRAPHIC NOMENCLATURE.